

AMENDMENTS TO CLAIMS

Claims 1-6 (Cancelled)

7. (Currently amended) ~~The device of claim 1, further~~ A data storage device comprising a conductive probe having a tip; a substrate including a semiconductor portion; a data storage medium including a layer of poled ferroelectric material for storing data, the ferroelectric layer on the substrate, between the tip and the substrate, the semiconductor portion and the ferroelectric layer forming an electrical junction; and a protective layer covering the ferroelectric layer, the protective layer not interfering with interactions between the probe tip and the ferroelectric layer.

Claim 8 (Cancelled)

9. (Currently amended) ~~The device of claim 1, further~~ A data storage device comprising a conductive probe having a tip; a substrate including a semiconductor portion; a data storage medium including a layer of poled ferroelectric material for storing data, the ferroelectric layer on the substrate, between the tip and the substrate, the semiconductor portion and the ferroelectric layer forming an electrical junction; and a circuit for causing the conductive probe to perform block and bulk erasure operations.

10. (Currently amended) ~~The device of claim 1, further~~ A data storage device comprising a conductive probe having a tip; a substrate including a semiconductor portion; a data storage medium including a layer of poled ferroelectric material for storing data, the ferroelectric layer on the substrate, between the tip and the substrate, the semiconductor portion and the ferroelectric layer forming an electrical junction; and means for heating the ferroelectric material above its Curie temperature, whereby block and bulk erasure can be performed.
11. (Currently amended) ~~The device of claim 1, further~~ A data storage device comprising a conductive probe having a tip; a substrate including a semiconductor portion; a data storage medium including a layer of poled ferroelectric material for storing data, the ferroelectric layer on the substrate, between the tip and the substrate, the semiconductor portion and the ferroelectric layer forming an electrical junction; and a read circuit for using the probe to sense changes in capacitance or leakage current of the junction.
12. (Currently amended) ~~The device of claim 1 further~~ A data storage device comprising a conductive probe having a tip; a substrate including a semiconductor portion; a data storage medium including a layer of poled ferroelectric material for storing data, the ferroelectric layer on the substrate, between the tip and the substrate, the semiconductor portion and the ferroelectric layer forming an electrical junction; and a read circuit for using the probe to apply an ac signal to local areas on the ferroelectric material, and detect changes in a non-linear component of a dielectric constant.

Claims 13-24 (Cancelled)

25. (Currently amended) ~~The method of claim 22, further comprising~~ A method of writing information to a layer of poled ferroelectric material, the method comprising using a probe to create local polarization changes in the material, the probe having a tip diameter no more than several nanometers; and heating the ferroelectric layer above its Curie temperature, whereby block erasure of the ferroelectric layer is performed.

26. (Currently amended) ~~The method of claim 22, further comprising~~ A method of writing information to a layer of poled ferroelectric material, the method comprising using a probe to create local polarization changes in the material, the probe having a tip diameter no more than several nanometers; and heating selected areas of the ferroelectric layer above the Curie temperature of the ferroelectric layer, whereby the areas of the ferroelectric layer are erased.

Claim 27 (Cancelled)

28. (Currently amended) ~~The method of claim 27, A method of reading~~ information from a ferroelectric layer that is on a semiconductor substrate, and forms an electrical junction with the semiconductor substrate, the method comprising:
scanning a surface of the ferroelectric layer with a probe having a sharp tip, the tip having a diameter of several nanometers; and
using the probe and the semiconductor substrate to detect polarity reversals at designated locations on the ferroelectric layer, each polarity

reversal at a designated location indicating a first stored value at that designated location, each non-reversal of polarity at an expected location indicating a second logic value stored at that designated location;

wherein the probe is used to sense changes in capacitance or leakage current of the junction.

29. (Currently amended) ~~The method of claim 27,~~ A method of reading information from a ferroelectric layer that is on a semiconductor substrate, and forms an electrical junction with the semiconductor substrate, the method comprising:

scanning a surface of the ferroelectric layer with a probe having a sharp tip, the tip having a diameter of several nanometers; and

using the probe and the semiconductor substrate to detect polarity reversals at designated locations on the ferroelectric layer, each polarity reversal at a designated location indicating a first stored value at that designated location, each non-reversal of polarity at an expected location indicating a second logic value stored at that designated location;

wherein the probe is used to apply an ac signal to local areas on the ferroelectric material, and wherein changes in a non-linear component of a dielectric constant are detected.

Claims 30-37 (Cancelled)